



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/608,130

06/30/2003

Hideyuki Tanaka

63979-026

3022

7590

05/18/2004

Michael E. Fogarty  
McDERMOTT, WILL & EMERY  
600 13th Street, N.W.  
Washington, DC 20005-3096

EXAMINER

HUYNH, ANDY

ART UNIT

PAPER NUMBER

2818

DATE MAILED: 05/18/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 10/608,130	Applicant(s) TANAKA ET AL.	
	Examiner Andy Huynh	Art Unit 2818	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
  - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
  - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
  - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 30 June 2003.
- 2a) ☐ This action is **FINAL**.      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-13 is/are rejected.
- 7) ☒ Claim(s) 2 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 June 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>10/17/03</u> | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

Claims **1-13** are pending in the application, which is a continuation of PCT/JP02/12691 filed 12/04/2002 is acknowledged.

#### ***Priority***

Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d) based on an application filed in JAPAN, 2001-378311 on 12/12/2001, and 2002-208399 on 07/17/2002.

#### ***Information Disclosure Statement***

This office acknowledges receipt of the following items from the applicant: Information Disclosure Statement (IDS) filed October 17, 2003. The references cited on the PTOL 1449 form have been considered.

#### ***Drawings***

The drawings are objected for the following reason.

Figure 11 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g).

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 3, 7, 8 and 10 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 3 recites the limitation "the second electrodes." There is insufficient antecedent basis for this limitation in the claim.

Claims 7 and 8 recite the limitation "the memory cells." There is insufficient antecedent basis for this limitation in the claim.

Claim 10 recites the limitations "the optional memory cell" and "the optional cell." There is insufficient antecedent basis for these limitations in the claim.

***Claim Rejections - 35 U.S.C. § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 4 and 5 are rejected under 35 U.S.C. 102(b) as being anticipated by Lowrey et al. (WO 00/57498, hereinafter referred to as "Lowrey"), Applicant submitted prior art (ASPA).

Art Unit: 2818

Regarding claim 1, Lowrey discloses in Fig. 1 and related text on page 4, lines 3-25, page 5, lines 7-15, page 7, line 14-page 8 line 25, a non-volatile memory/an memory device (100) comprises:

- an insulating substrate/dielectric regions (128, 140) having a plurality of first electrodes/first contacts (130a, 130b) extending therethrough from a front surface of the substrate/the dielectric regions to a rear surface thereof,

- a second electrode/a second contact (270) formed on one surface side of the substrate/the dielectric regions, and

- a recording layer/an memory material layer (250) held between the first electrodes/contacts and the second electrode/contact and variable in resistance value by electric pulses applied across the first electrodes and the second electrode (page 4, lines 12-15),

the plurality of first electrodes/contacts being electrically connected to the recording layer in a region constituting a single memory cell/an memory device (100).

Regarding claim 4, Lowrey discloses the non-volatile memory according to claim 1 wherein the recording layer/the memory material layer comprises a phase-change material having at least two stable phases different in resistance value and capable of being reversibly switched between the phases (Page 4, lines 12-15).

Regarding claim 5, Lowrey discloses the non-volatile memory according to claim 4 wherein the phase-change material contains a chalcogenide material (page 38, 13-14).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lowrey et al. (WO 00/57498, hereinafter referred to as "Lowrey"), Applicant submitted prior art (ASPA).

Lowrey discloses the claimed limitations except for the non-volatile memory according to claim 1 wherein the first electrodes are randomly arranged relative to the insulating substrate. It is obvious that the ability of randomness of arrangements would increase design flexibility. Therefore, the arrangement of the electrodes respect to the insulating substrate could be done in many different ways depending upon design applications. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to arrange randomly the first electrodes relative to the insulating substrate to increase the flexibility of design. Furthermore, it has been held that rearranging parts of an invention involves only routine skill in the art. In re Japikse, 86 USPQ 70.

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lowrey et al. (WO 00/57498, hereinafter referred to as "Lowrey"), Applicant submitted prior art (ASPA) in view of Sasaki Makoto (JP: 04-045584), Applicant submitted prior art (ASPA).

Lowrey discloses the claimed limitaions except for the non-volatile memory according to claim 1 wherein each of the first electrodes has a diameter of 5 to 500 nm. Sasaki Makoto

Art Unit: 2818

teaches that it is known to the art as set forth in the Abstract a chalcogenide semiconductor layer is filled inside the through-hole of a small diameter (1.5 to 0.1  $\mu\text{m}$ ) to reduce a current value of reset pulse which changes the chalcogenide semiconductor from crystal state to amorphous state. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to utilize the first electrodes has a diameter of 5 to 500 nm in order to reduce the current value of reset pulse, and hence to reduce resistance.

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lowrey et al. (WO 00/57498, hereinafter referred to as "Lowrey"), Applicant submitted prior art (ASPA) in view of Nishihara et al. (US Pub. No. 2002/0131309 A1, filed 10/19/01, dated 09/19/02, hereinafter referred to as "Nishihara").

Lowrey discloses the non-volatile memory according to claim 1 wherein the recording layer/the memory material layer comprises Ge-Sb-Te as set forth on page 30 lines 2-5, except for each of the first electrodes comprises at least one of rhodium (Rh), platinum (Pt), palladium (Pd), nickel (Ni), cobalt (Co), chromium (Cr), rhenium (Re), iridium (Ir) and gold (Au). Nishihara teaches that electrodes used in a memory may be formed of at least one of Al, Au, Ag, Cu, Pt, Ti, W, etc., or a combination thereof as set forth in [0058]. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to use the electrode including at least one of Al, Au, Ag, Cu, Pt, Ti, W, etc., or a combination thereof, as taught by Nishihara, since it was known in the art that any electrode material may be used so long as electric energy can be applied to the recording layers.

Art Unit: 2818

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lowrey et al. (WO 00/57498, hereinafter referred to as "Lowrey"), Applicant submitted prior art (ASPA) in view of Ebina et al. (USP: 5,912,103, hereinafter referred to as "Ebina").

Lowrey discloses the claimed limitations except for the non-volatile memory according to claim 1 wherein the insulating substrate is a polycarbonate substrate. Ebina teaches that it is known to the art the polycarbonate substrate is used in the phase change optical recording medium since it has excellent in mechanical properties and has a lower humidity absorption in comparison with other plastics as set forth in column 6, lines 46-50. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to utilize a polycarbonate substrate as the insulating substrate, as taught by Ebina because of its excellence in mechanical properties and lower humidity absorption in comparison with other plastics.

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lowrey et al. (WO 00/57498, hereinafter referred to as "Lowrey"), Applicant submitted prior art (ASPA) in view of Berggren et al. (IEEE, Paper electronics and electronic paper, dated 10/2001, hereinafter referred to as "Berggren").

Lowrey discloses the claimed limitations except for a paper display comprises the non-volatile memory according to claim 1. Berggren teaches that the paper display technology is very robust and particularly the environmental aspects and low cost manufacturing make this technology very promising for the future, and have been used in many different applications. It would have been obvious to one of ordinary skill in the art at the time of the invention was made



Art Unit: 2818

to use the paper display including the non-volatile memory to store image and data, since it was known in the art that the non-volatile memory is commonly used for image and data storage.

***Allowable Subject Matter***

Claim 2 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims, since the prior made of record and considered pertinent to the applicant's disclosure does not teach or suggest the claimed limitations.

The prior art of records, taken alone or in combination, fail to teach the claimed limitations the non-volatile memory according to claim 1 wherein the first electrodes are filled respectively in a plurality of fine pores formed in the insulating substrate, the fine pores being formed by irradiating the substrate with a beam of ion or neutron high-energy particles perpendicular to the front surface thereof to produce defects in the substrate, and selectively etching the defects produced.

***Conclusion***

A shortened statutory period for response to this action is set to expire 3 (three) months and 0 (zero) day from the day of this letter. Failure to respond within the period for response will cause the application to become abandoned (see M.P.E.P 710.02(b)).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andy Huynh, (571) 272-1781. The examiner can normally be reached on Monday-Friday from 8:30 AM to 5:00 PM.

Art Unit: 2818

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on (571) 272-1787. The Fax number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose phone number is (703) 308-0956.

AH

May 13, 2004



Andy Huynh

Patent Examiner